Modular Reconfigurable C4I Interface (MRCI)

- Interim Systems Requirements Review -

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Purpose

- Review MRCI program with four different communities
- Provide inputs to PM for MRCI requirements development
- Insure at outset MRCI is being developed to meet user needs

Agenda

- Overview brief on the MRCI   DMSO
- MRCI Program Plan   NRaD/PM
- MRCI Strawman Requirements   NRaD/PM
- MRCI Technical Approach Summary   Int Cont/SAIC
- Discussion

- 23 Apr 96 - MRCI Systems Requirements Review

M&S Master Plan

Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6
Develop a common technical framework for M&S	Provide timely and authoritative representations of the natural environment	Provide authoritative representations of systems	Provide authoritative representations of human behavior	Establish a M&S infrastructure to meet developer and end-user needs	Share the benefits of M&S

- **M&S Master Plan Has six objectives**
- **Most important is the technical framework**
  - **High Level Architecture**
  - **CMMS**
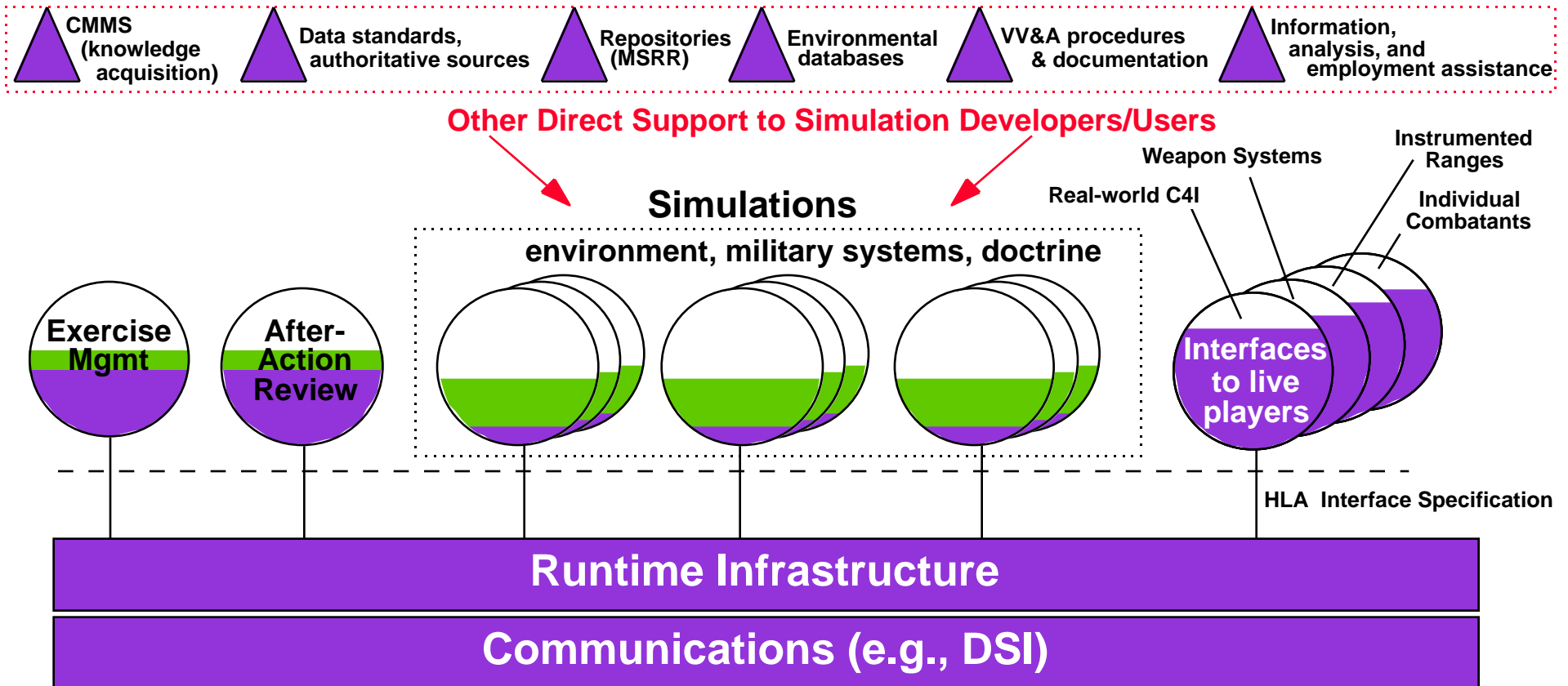 - **Data Standardization**

DoD M&S Master Plan Objective 1-1

- **Objective 1-1. Establish a common high-level simulation architecture to facilitate the interoperability of all types of models and simulations among themselves and with C4I systems, as well as to facilitate the reuse of M&S components.**

Tomorrow's Simulations will be Built on Reusable Elements

CMMS (knowledge acquisition)

Data standards, authoritative sources

Repositories (MSRR)

Environmental databases

VV&A procedures & documentation

Information, analysis, and employment assistance

Other Direct Support to Simulation Developers/Users

Weapon Systems

Instrumented Ranges

Real-world C4I

Individual Combatants

Simulations

environment, military systems, doctrine

Exercise Mgmt

After-Action Review

Interfaces to live players

HLA Interface Specification

Runtime Infrastructure

Communications (e.g., DSI)

Key: developed once, reused across all DoD simulation systems

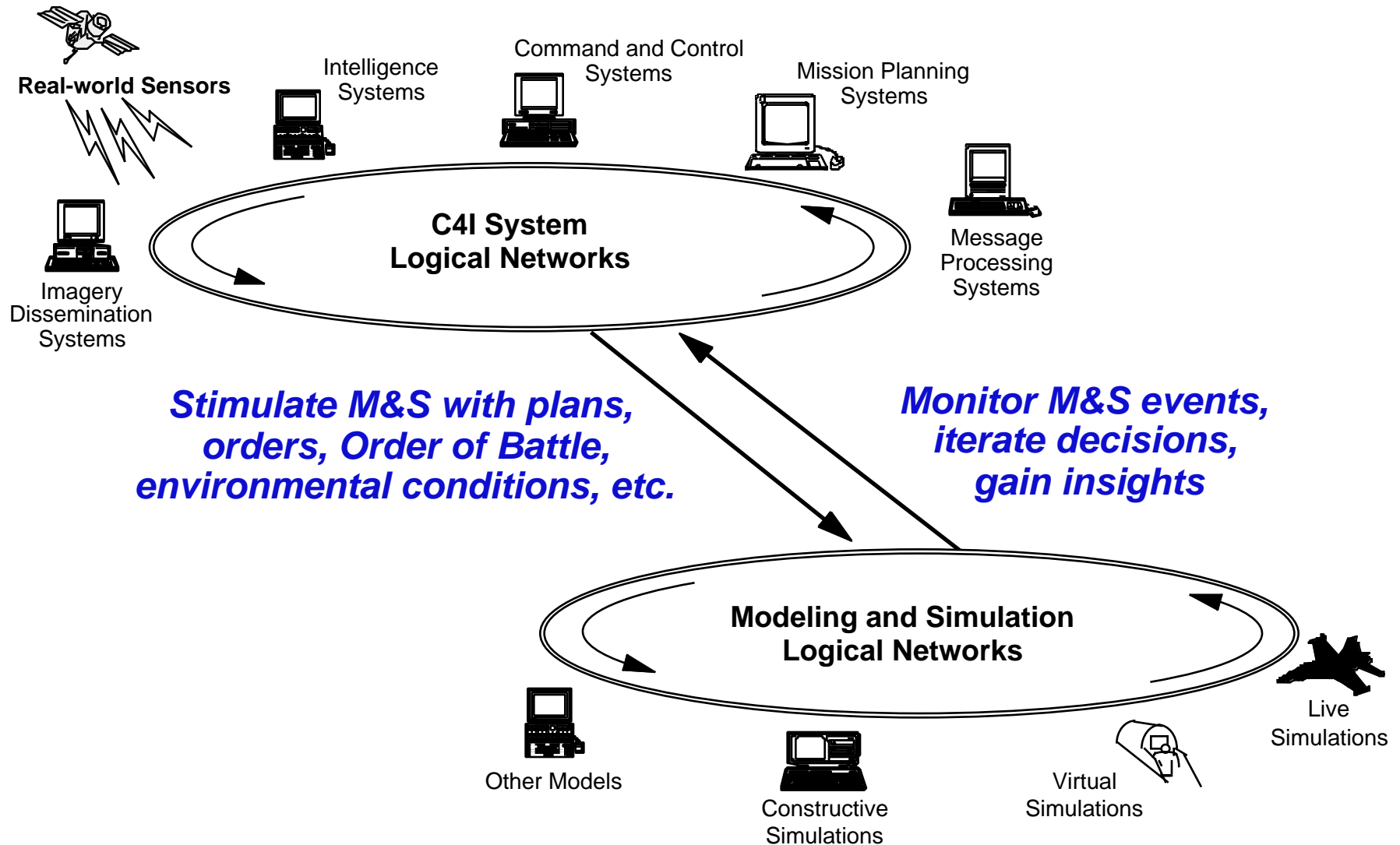developed once, reused across a simulation domain

unique

Purpose of MRCI Program

- **Develop a reusable set of technical tools to support 'seamless' interfaces between C4I systems and simulations**

C4I-Sim Operational Concept

Real-world Sensors

Intelligence Systems

Command and Control Systems

Mission Planning Systems

C4I System Logical Networks

Message Processing Systems

Imagery Dissemination Systems

Stimulate M&S with plans, orders, Order of Battle, environmental conditions, etc.

Monitor M&S events, iterate decisions, gain insights

Modeling and Simulation Logical Networks

Live Simulations

Other Models

Constructive Simulations

Virtual Simulations
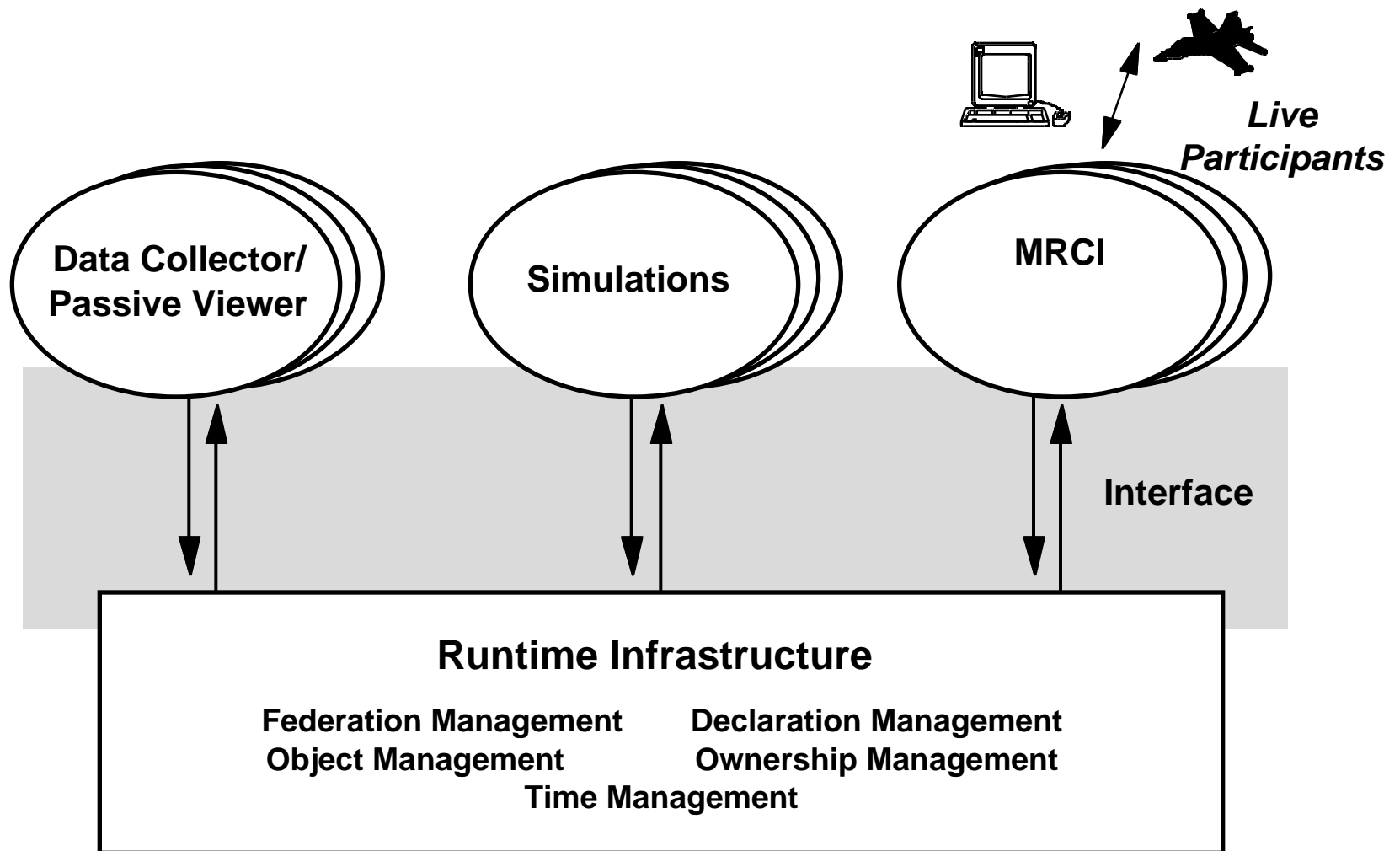
DMSO

Dual Goals: (1) <u>Take M&S to War</u>   (2) <u>Train as You Fight</u>

- **Provide additional information to operational planners**
  - **weapons effects, sensor capabilities, etc.**

- **Provide additional insights/analysis regarding operational plans**
  - **potential dangers, conflicts, losses, and effectiveness**

- **Facilitate mission rehearsal**

- **Make it easier to use simulations for training**
  - **users interface with M&S using their own C4I systems**

- **Provide live C4I representations in simulation exercises**

More effective planning, rehearsal, and operations = more combat power

Functional View
of the Architecture
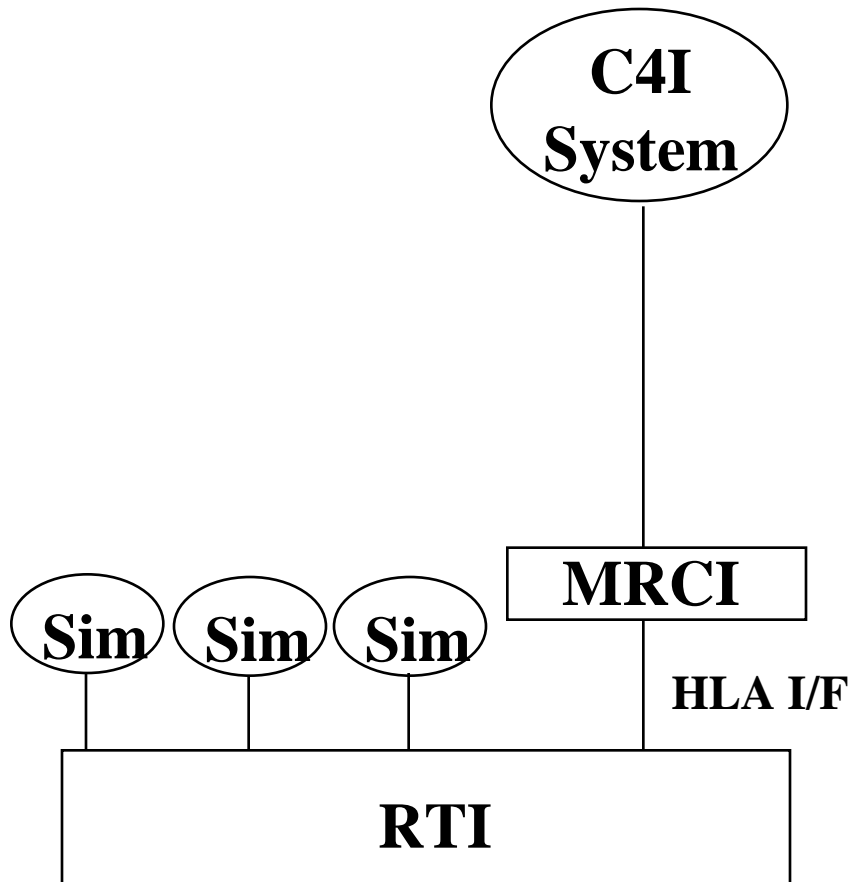
Live
Participants

Data Collector/
Passive Viewer

Simulations

MRCI

Interface

Runtime Infrastructure

Federation Management   Declaration Management
Object Management   Ownership Management
Time Management

Simulation <--> C4I Functionality

C4I System

MRCI

HLA I/F

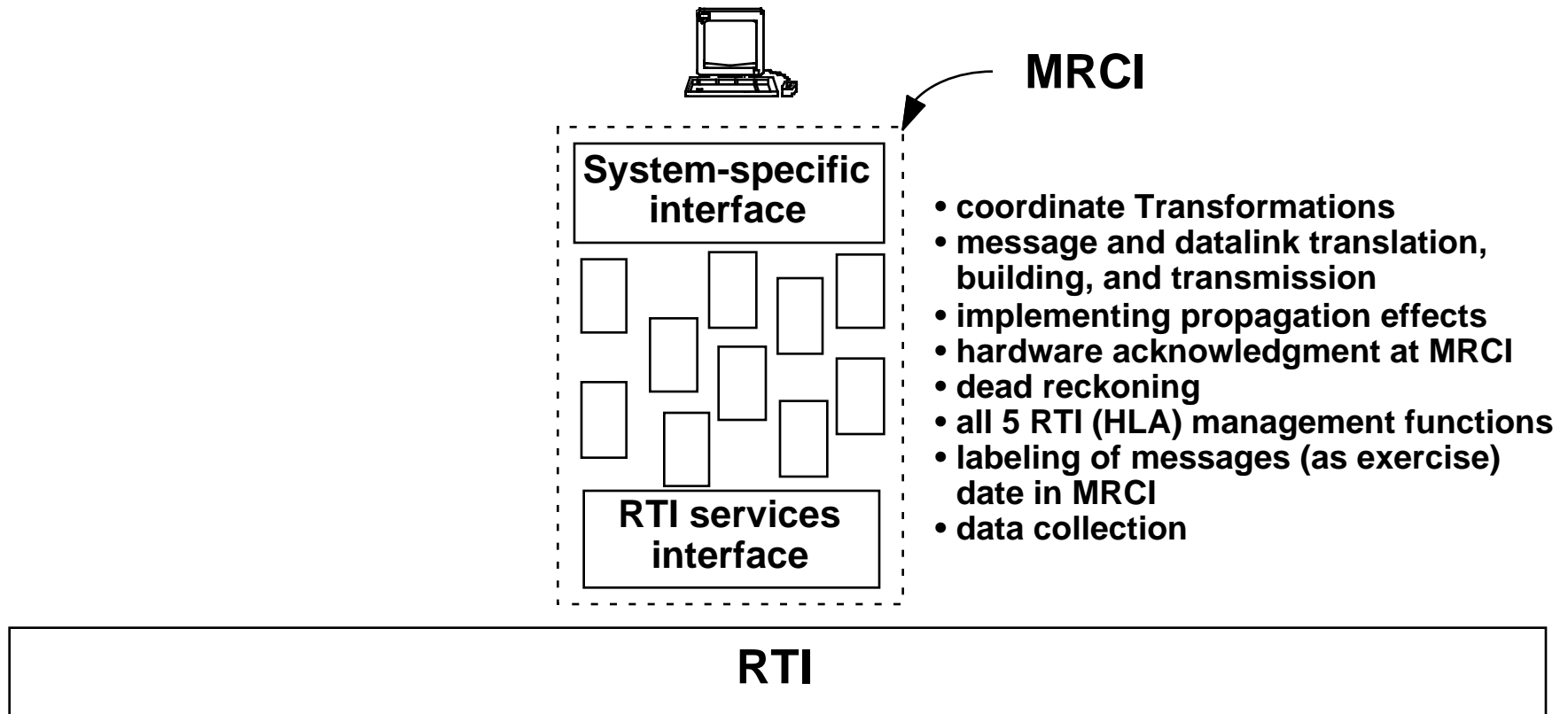**Sim** **Sim** **Sim**

RTI

- **C4I information exchange**
  - Live system sends orders, reports, data etc. to simulated command nodes/systems
  - Simulated systems or command nodes send orders, reports, data to live systems

- **Ground truth exchange**
  - Simulated systems interact with (shoot, collide, jam) live systems
  - Live systems must send ground truth updates in accordance with FOM so simulation can project live system into simulated world*

- **Compliance with HLA I/F**
  - Appropriate use of RTI services*

* Artificialities due to simulation interface

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MRCI Notional Design

MRCI

System-specific interface

RTI services interface

- coordinate Transformations
- message and datalink translation, building, and transmission
- implementing propagation effects
- hardware acknowledgment at MRCI
- dead reckoning
- all 5 RTI (HLA) management functions
- labeling of messages (as exercise) date in MRCI
- data collection

RTI

MRCI Organizational Structure

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┌─────────────────────────────────────────┐
│     Architecture Management Group         │
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                    ┊
┌─────────────────────────────────────────┐
│          MRCI Oversight Council           │
│        DMSO-Chair/DISA-Vice Chair         │
│   -   Technical Peer Review Team          │
│   -   Requirements/User Review Teams (x3) │
└─────────────────────────────────────────┘
                    │
┌─────────────────────────────────────────┐
│          Project Management               │
│               NRaD                        │
│          Donoghue/Tiernan                 │
└─────────────────────────────────────────┘
                    │
┌─────────────────────────────────────────┐
│        Integrating Contractor             │
│                SAIC                       │
└─────────────────────────────────────────┘
                    │
        ┌───────────┼───────────┐
    ┌───────┐   ┌───────┐   ┌───────┐
    │  Sub  │   │  Sub  │   │  Sub  │
    └───────┘   └───────┘   └───────┘
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Review Teams

- **Peer Review Team**
  - Judith Dahmann - DMSO
  - John Diem - TEXCOM (CBS/ABCS)
  - Russ Richardson - SAIC (JPSD)
  - Marnie Salisbury - MITRE (STOW)
  - Jeff Wolford - Lockheed (TACCSF)
  - Martha Farinacci - MITRE (D8 - SIMLINK)
  - Joe Lacetera - MITRE (CECOM - SINCGARS)
  - Dan Sandini - MITRE (ESC)
  - Joe Jennings - MITRE (LAM TF)
  - Richard Wisehart - Frontier (CWIC)

- **Simulation Program Review Team**
  - JSIMS, STOW, WARSIM, NASM, BFTT, JTC/ALSP Review Panel, CATT, others

- **Simulation Center Review Team**
  - JWFC, JTASC, WPC, KBSC, NSC, BTS, others

- **C4I System Review Team**
  - GCCS (DISA - D8), Services, and others